Code: 9A02305

R09/SS

B.Tech II Year I Semester (R09/R13) Regular & Supplementary Examinations December 2015

ELECTRICAL CIRCUITS

(Common to EEE, EIE, E.Con.E, ECE & ECC)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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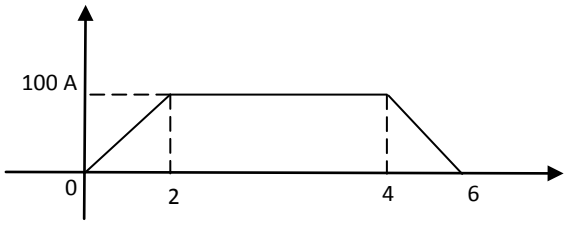
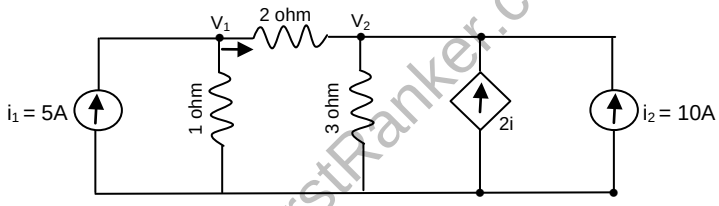
1 (a) What is the difference between an ideal source and a practical source? Draw the relevant characteristics of the above sources.

(b) A current wave form flowing through an inductor of 1mH is shown below. Obtain and sketch the waveform of the voltage across the inductor.



2 (a) Explain the node analysis used in the circuit analysis.

(b) For the network shown below figure, determine the node voltages V_1 and V_2. Determine the power dissipated in each resistance.



3 (a) Explain concept of power and power factor of an RL circuit.

(b) Consider the RL series circuit with an impedance angle of 50 degrees at a frequency of 60 Hz at what frequency the magnitude of the impedance will be twice the magnitude of the impedance at 60 Hz.

4 (a) Write the properties and applications of parallel resonant circuit.

(b) A coil is connected in series with a variable capacitor across V(t) = 1000t. The capacitor is varied and the current is maximum when C = 10 micro farads. When C = 12.5 micro farads the current is 0.707 times the maximum value. Find L, R, and Q of the coil.

5 (a) Derive the expression for equivalent inductance of two coils connecting in series opposing.

(b) An air cored solenoid has a length of 80 cm and a diameter of 2 cm. Calculate its inductance if it has 800 turns. Also, calculate the energy stored in the inductor if the current rises from 0 to 10 A. Calculate self induced emf in the solenoid.

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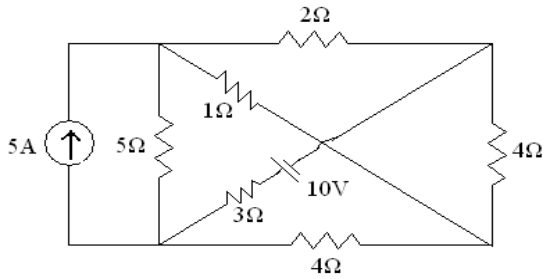
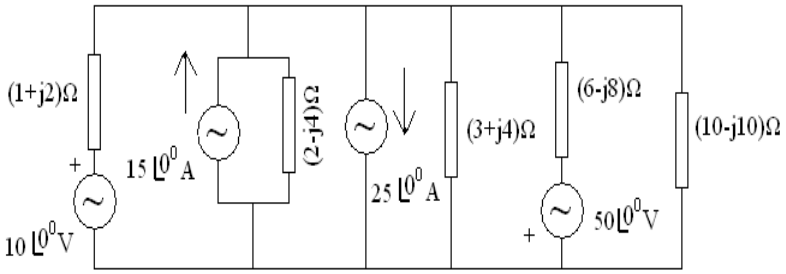
6 Using nodal analysis find current through all the elements in the circuit shown below and also find power dissipated by all the resistors.



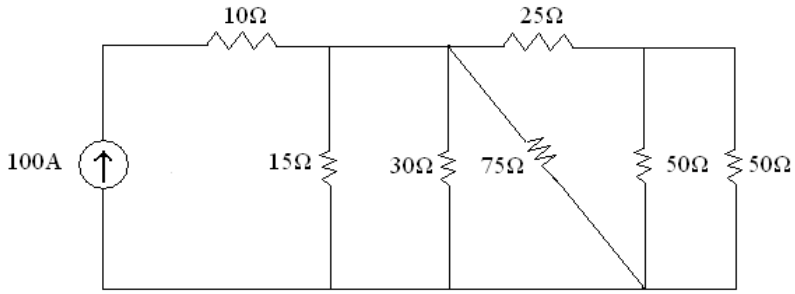
7 (a) Find the condition for maximum power transfer to the load for A.C network, when load impedance is variable.

(b) Determine current through (10-j10)Ω impedance using Milliman's theorem.



8 (a) State and explain superposition theorem.

(b) Prove Tellegen's theorem for the network shown below figure.



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